

# A remarkable New *Nilotonia*-Species from the Pollino Mountains (Southern Italy)

(Acari, Actinedida, Nilotoniidae)

By Reinhard Gerecke

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Both sexes of *Nilotonia pontifica*, spec. nov. from the Pollino mountains (Italy, Basilicata, Potenza) are described. The male shows mixed characters of the genera *Nilotonia* Thor and *Manotonia* K. Viets. A new diagnosis of the genus *Nilotonia* is presented and the systematic position of *Manotonia* is discussed. The species is threatened by the degradation of spring biotopes in Southern Italy.

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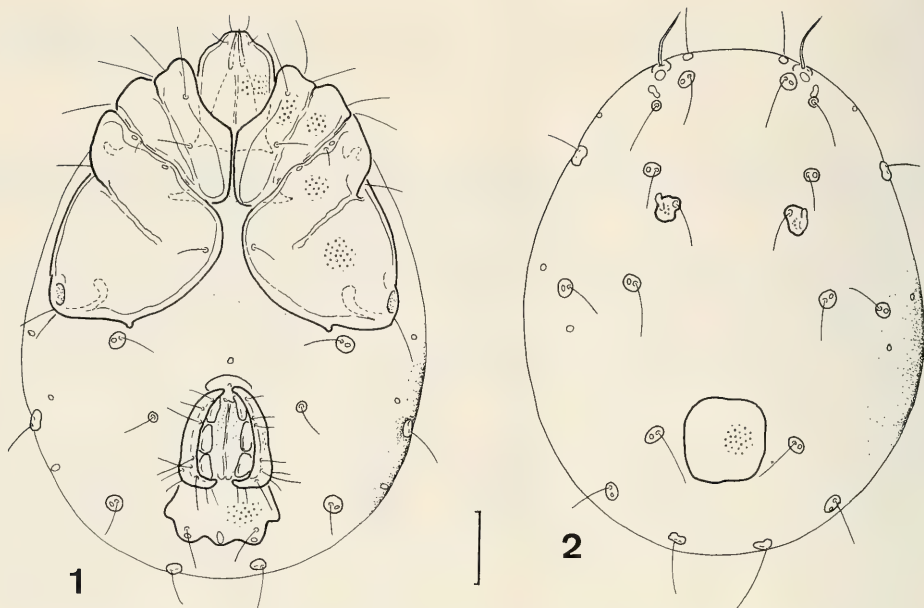
## Introduction

During a collecting trip in Southern Italy in autumn 1990, water mites were collected for the first time in the projected National Park "Massiccio di Pollino". A new water mite species has been found, whose morphological features require a redefinition of the genus *Nilotonia* Thor, 1905 and the discussion of the systematic position of *Manotonia* Viets, K., 1935.

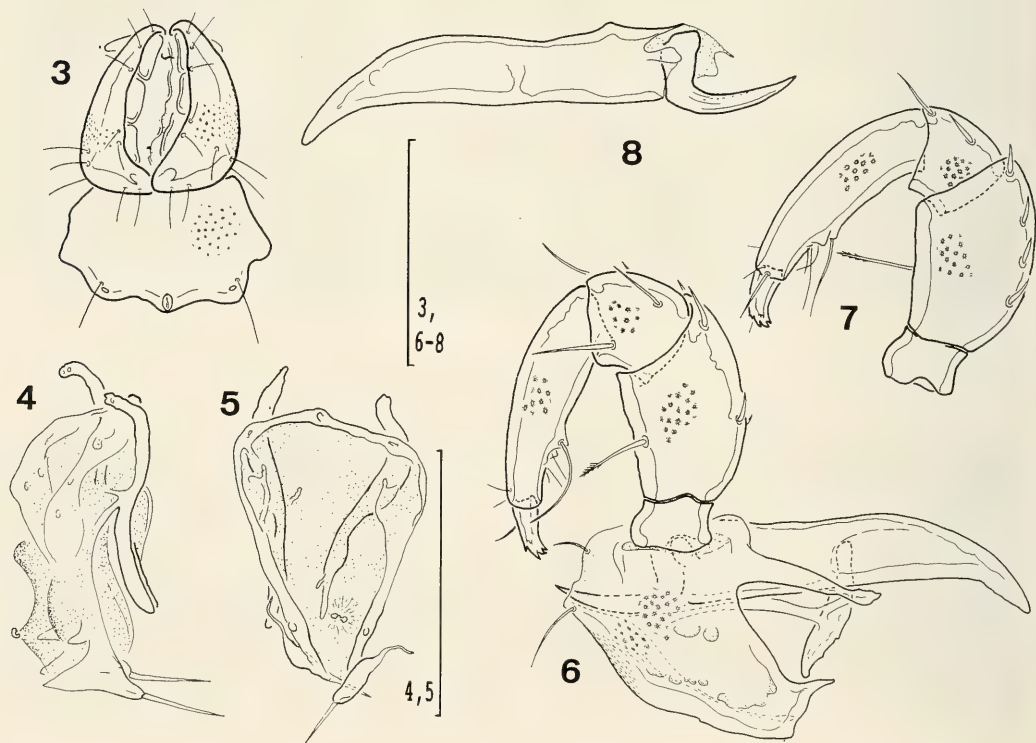
## *Nilotonia pontifica*, spec. nov.

Types. Holotype: ♂, prep. 40/7/1; paratypes, 2 ♂♂, prep. 40/7/2–3, 5 ♀♀ prep. 40/7/4–8, all specimens mounted on slides in Hoyer's fluid and conserved in coll. GER. Italy, Basilicata. Terranova di Pollino (Pollino mountains, province Potenza). Rheohelocrenic spring at Piano di Iumento, 1570 m a. s. l., U. T. M.-coordinates XE 072 222. 01-10-1990, 10°C.

Diagnosis. Characters of the family Nilotoniidae. Males with external genital organ placed caudally of the posterior margin of cx.-4 and excretory porus positioned on a polygonal postgenital sclerite. Females with a genital organ placed in a genital bay formed by the cx.-4 and with excretory porus surrounded by a chitinous ring. In both sexes, I.-IV.-6 with a long, slender subterminal seta and dorsum with a pair of little anterior platelets and with a single subrectangular posterior dorsal shield.



Figs 1, 2. *Nilotonia pontifica* ♂. 1. Ventral view. 2. Dorsal view. Scale = 100  $\mu$ m.



Figs 3-8. *Nilotonia pontifica* ♂. 3. Genital organ and postgenital platelet, caudoventral view. 4. Genital skeleton, lateral view. 5. Genital skeleton, anterior view. 6. Capitulum, left palp and left chelicera, lateral view. 7. Right palp, medial view. 8. Right chelicera, lateral view. Scale = 100  $\mu$ m.

Description (for all measurements, see Tab. 1 and 2).

Male: Length 695–740  $\mu\text{m}$ , width 525–560  $\mu\text{m}$ , soft-bodied. Cuticular membrane with a fine, dense lineation. Position of eyes and glandularia as in all species of the genus. Dorsal view (Fig. 2): In the anterior part of the dorsum a pair of roundish sclerites, formed by the fusion of postocularia with a pair of dorsocentralia, in its posterior part a single, subrectangular or trapeziform dorsal shield with a diameter of about 100  $\mu\text{m}$ .

Ventral view (Fig. 1): Cx.-1 in their anterior part forming the capitular bay, posterior of it medially separated by a fine membranous suture line of about 90  $\mu\text{m}$  in length. On each side, cx.-1 fused completely with cx.-2, suture line visible on its whole length. Similarly, cx.-3 of each side fused

Table 1: *Nilotonia pontifica*, spec. nov., body and leg measurements (l. = length, w. = width)

	Males					Females				
	Mean	Min.	Max.	S.dev.	n	Mean	Min.	Max.	S.dev.	n
Total l.	722	695	740	23.6	3	722	593	890	122.0	5
Total w.	545	525	560	18.0	3	576	490	670	80.4	5
Dorsal shield, l.	112	108	117	4.5	3	115	94	140	16.8	5
Dorsal shield, w.	124	112	130	10.4	3	105	99	108	4.1	5
Dorsal shield, l./w.	0.9	0.9	1.0	0.1	3	1.1	0.9	1.3	0.2	5
Cx-1, l.	210	202	216	7.1	3	229	224	238	5.7	5
Cx-3, l.	311	302	322	10.3	3	338	315	400	35.1	5
Genital flaps, l.	128	122	136	7.2	3	176	166	186	7.8	5
Pregenital sclerite, w.	72	67	75	4.2	3	113	105	128	8.9	5
Postgenital sclerite, l.	—	—	—	—	—	113	100	121	9.1	4
Genital skeleton, l.	112	110	114	2.8	2	—	—	—	—	—
Cella proximalis, w.	72	67	76	6.4	2	—	—	—	—	—
Postgenital plate, w.	160	157	166	5.2	3	—	—	—	—	—
Postgenital plate, l.	89	81	94	6.8	3	—	—	—	—	—
L.-IV-6, subterm. seta, l.	77	65	90	12.5	3	85	81	90	4.5	3
L.-IV-6, subterm. seta, w.	3	3	3	0.0	3	4	4	5	0.6	3
L.-IV-6, term. br., l./w.	25.7	21.7	30.0	4.2	3	19.8	18.0	21.3	1.7	3

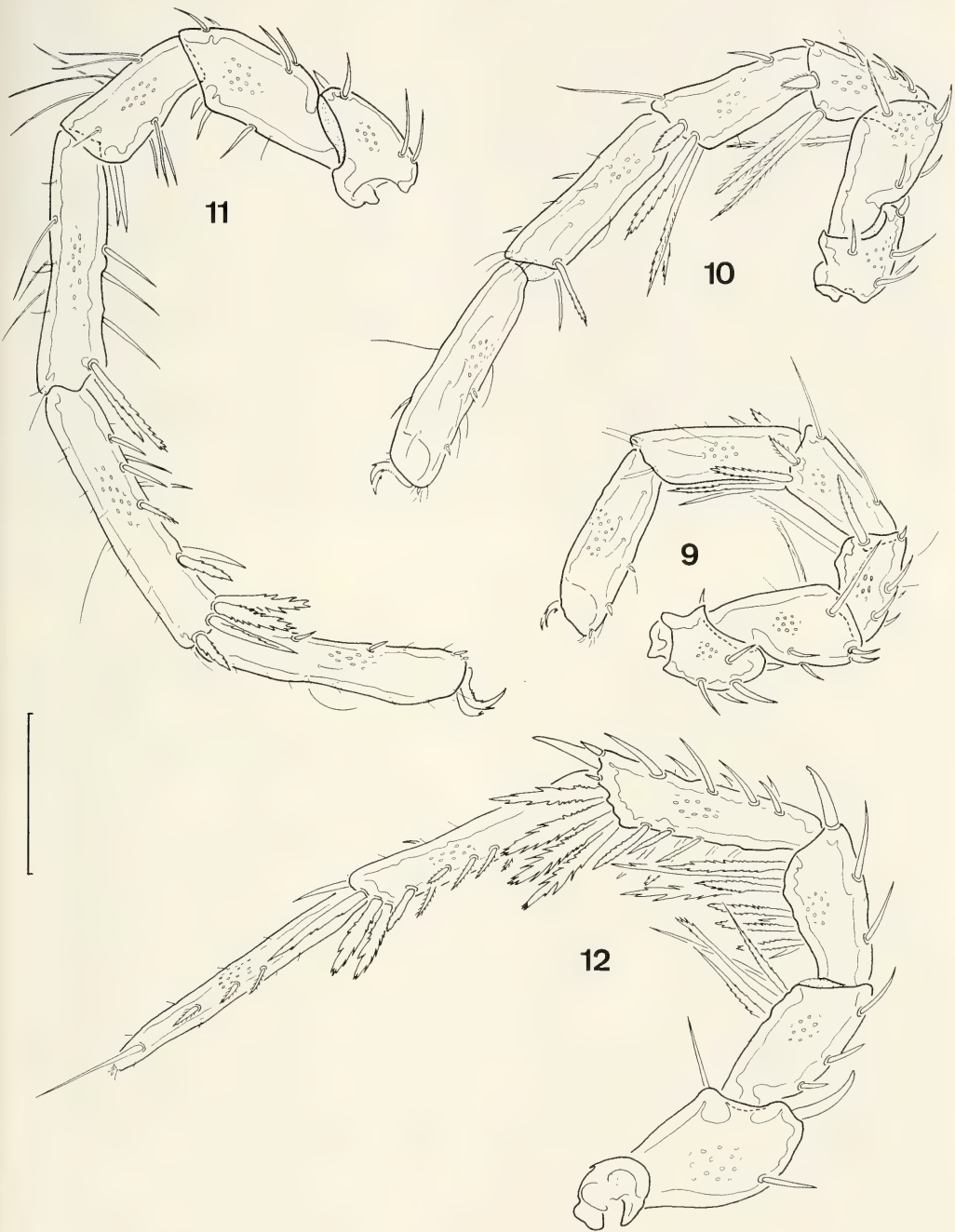
Leg segments	L.-I	L.-II	L.-III	L.-IV	L.-I	L.-II	L.-III	L.-IV
Dorsal l.								
Segm. 1	61	65	83	156	65	69	90	160
Segm. 2	67	76	98	100	81	86	103	108
Segm. 3	76	87	94	103	81	90	103	110
Segm. 4	92	108	168	148	94	114	172	163
Segm. 5	112	134	185	197	112	137	179	190
Segm. 6	123	154	172	190	116	154	168	204
total l.	531	624	800	894	549	650	815	935
Dorsal l. [% total l.]								
Segm. 1	11	10	10	17	12	11	11	17
Segm. 2	13	12	12	11	15	13	13	12
Segm. 3	14	14	12	12	15	14	13	12
Segm. 4	17	17	21	17	17	18	21	17
Segm. 5	21	21	23	22	20	21	22	20
Segm. 6	23	25	22	21	21	24	21	22

Table 2: *Nilotonia pontifica*, spec. nov., mouth part measurements (l. = length, w. = width)

	Males					Females				
	Mean	Min.	Max.	S.dev.	n	Mean	Min.	Max.	S.dev.	n
Capitulum, ventral l.	154	150	163	7.5	3	176	170	189	7.8	5
Capitulum, dorsal l.	185	178	189	5.9	3	207	194	211	8.5	4
Capitulum, height	125	115	130	8.7	3	144	134	154	9.1	4
Chelicera, basal segment	207	194	220	13.0	3	230	225	233	3.1	5
Chelicera, claw	75	74	76	1.2	3	86	83	90	2.9	5
Chel., basal segm./claw	2.8	2.6	2.9	0.1	3	2.7	2.6	2.8	0.1	5
Chelicera, l.	281	268	296	14.0	3	316	312	321	3.9	5
Chelicera, h.	45	45	45	0.0	2	55	54	57	1.3	5
Chelicera, l./h.	6.1	6.0	6.2	0.2	2	5.7	5.6	5.8	0.1	5
Palp segments, dorsal l.										
P.-1	22	20	25	2.6	3	28	27	29	1.1	5
P.-2	118	116	119	1.7	3	134	125	143	6.5	5
P.-3	60	58	63	2.9	3	73	70	76	2.2	5
P.-4	132	130	134	2.0	3	151	145	156	3.9	5
P.-5	34	32	37	2.5	3	39	36	40	1.8	5
Palp, total l.	366	361	374	7.0	3	425	406	442	13.4	5
Palp segments, dorsal l. [% total l.]										
P.-1	6.0	5.5	6.9	0.8	3	6.5	6.3	6.8	0.2	5
P.-2	32.2	31.8	32.8	0.5	3	31.6	30.8	32.4	0.6	5
P.-3	16.3	16.0	16.8	0.5	3	17.2	16.5	18.0	0.6	5
P.-4	36.1	35.8	36.4	0.3	3	35.5	35.2	35.9	0.3	3
P.-5	9.4	8.9	9.9	0.5	3	9.1	8.9	9.4	0.2	5
Ratio P.-2/P.-4	0.9	0.9	0.9	0.0	3	0.9	0.9	0.9	0.0	5
Palp segments, h.										
P.-1	46	45	47	1.0	3	55	54	56	1.0	5
P.-2	67	67	67	0.0	3	77	74	81	3.0	5
P.-3	52	52	52	0.0	3	60	58	61	1.3	5
P.-4	36	35	36	0.6	3	43	41	45	1.4	5
P.-5	16	15	16	0.6	3	21	20	22	0.9	5
Palp segments, dorsal l./h.										
P.-1	0.5	0.4	0.5	0.0	3	0.5	0.5	0.5	0.0	5
P.-2	1.8	1.7	1.8	0.0	3	1.8	1.7	1.8	0.0	5
P.-3	1.1	1.1	1.2	0.1	3	1.2	1.1	1.2	0.0	5
P.-4	3.7	3.6	3.8	0.1	3	3.5	3.2	3.7	0.2	5
P.-5	2.2	2.1	2.3	0.1	3	1.9	1.8	2.0	0.1	5
P.-2, ventral l.	73	72	74	1.2	3	85	83	88	1.9	5
P.-2, ventral bristle, l.	49	47	50	1.5	3	49	43	52	3.8	5
P.-2, ventr. l./bristle l.	1.5	1.5	1.5	0.0	3	1.8	1.6	1.9	0.1	5
P.-4, prox. ventral l.	67	65	72	4.0	3	81	78	85	3.2	5
P.-4, dist. ventral l.	36	36	36	0.0	3	38	37	40	1.1	5
P.-4, prox./dist. ventr. l.	1.9	1.8	2.0	0.1	3	2.1	2.0	2.3	0.1	5

with cx.-4, but suture line obsolete before reaching the medial margin of cx.-3/4. Between cx.-2 and cx.-3 a fine, undulate, membranous suture line. The anterior margins of cx.-3 in their centres pierced by a pair of glandularia; more laterally, at a distance of about 50  $\mu\text{m}$  from their anterior angles incorporating the coxoglandularia 3. Medial and posterior margins of cx.-4 equally rounded,

without secondary chitination, bearing a little knob-shaped apodeme at about 100  $\mu\text{m}$  from the insertion of l.-IV.

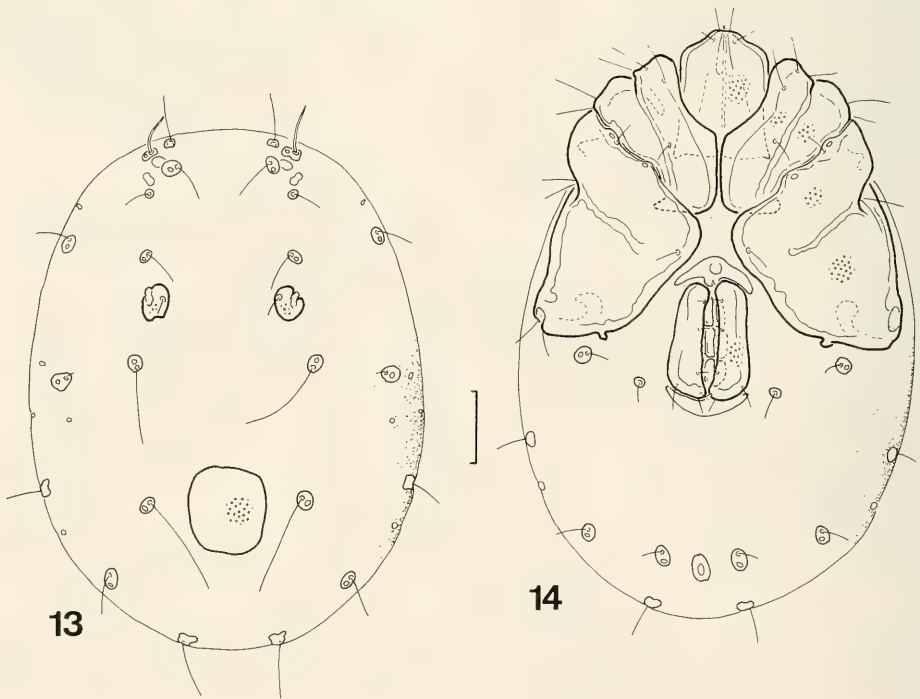


Figs 9–12. *Nilotonia pontifica* ♂. 9. Leg. 1. 10. Leg. 2. 11. Leg. 3. 12. Leg. 4. Scale = 100  $\mu\text{m}$ .

Position of genital organ not in a genital bay, but about 40–50  $\mu\text{m}$  caudally from the posterior margin of cx.-4. In the membranous region between coxae and genital organ a minute, roundish unpaired sclerite. A halfmoon-shaped pregenital sclerite surrounding the anterior ends of the genital flaps. Both flaps bearing about 10 fine hairs, genital field with three pairs of acetabula. Postgenital sclerite not identifiable, probably a part of the postgenital platelet which includes also the excretory porus and the ventroglandularia 3 (Fig. 3). Anterior margin of this platelet concave, embracing the caudal region of the genital organ, its lateral and posterior margins more or less undulate, with at least 3 protrusions at the sites of the excretory porus and of the flanking glandularia. Postgenital sclerite separated from the genital flaps by a fine membranous suture line.

Genital skeleton with reductional features (Figs 4, 5). Brachia distalia very small and laterally ending in fine, membranous tips, but with well-developed, long apical setae. Brachia proximalia slender and equally curved, at their base with remarkably long, distally directed processus whose tips reach the region of the brachia distalia. Proximal chamber large, with well developed lateral wall sclerites which (probably incorporating further sclerites) appear to continue throughout the length of the organ until the basal region of the brachia distalia. Carina posterior completely reduced, in the region of the carina anterior only a minute, knob-shaped sclerite of uncertain identity.

Mouth parts showing the general characteristics of the genus *Nilotonia*: Capitulum (Fig. 6) robust, with weakly-developed, dorsally directed ventral apodemes and relatively long horizontal dorsal apodemes. Its ventral margin convex on the level of the insertion of the palps, slightly concave in its rostral region. Cheliceral claws with two rows of fine denticules (Fig. 8). Chaetotaxy of palps (Figs 6, 7) as in other species of the genus, p.-2 ventrally straight and smooth (completely lacking denticulation), ventral bristle relatively long (ratio ventral l./ bristle l. 1.5–1.9), p.-4 robust, with well developed ventral tubercles, their position subdividing its ventral side in a ratio 2:1. The lateral



Figs 13, 14. *Nilotonia pontifica* ♀. 13. Dorsal view. 14. Ventral view. Scale = 100  $\mu\text{m}$ .

tubercle bearing laterally a remarkably developed long hair, furthermore 3 fine hairs placed between lateral and medial tubercle.

For shape and chaetotaxy of leg segments, see Figs 9–12. All legs with long, deeply serrate blade-like setae at the ventrodistal margins mainly of the segments 3 and 4. Length of ventrodistal setae of l.-I-2/3, l.-II-2/3 and l.-IV-2/3 extending beyond the ventrodistal edges of the respective following segments. L.-III (Fig. 11) with relatively short setae only, bearing groups of strong hairs on the dorsal side mainly of segments 3 and 4. L.-IV-1 dorsodistally with a strong, curved swordlike seta, l.-IV-6 with a long, slender subterminal bristle and apically with a pair of rudimentary claws.

Female generally taller than male (total length 593–890  $\mu\text{m}$ ), as reflected by many body and mouthpart measurements (e. g. total l. of palps 406–442  $\mu\text{m}$ ,  $\sigma\sigma$  361–374  $\mu\text{m}$ ; ventral l. of capitulum 170–188  $\mu\text{m}$ ,  $\sigma\sigma$  150–163  $\mu\text{m}$ ). General morphology of dorsum (Fig. 13), coxae (Fig. 14) and extremities in good agreement with the features described above for the male. The measurements indicate some differences between the two sexes in shape of chelicerae (more slender in males), relative length of ventral bristle of p.-2 (relatively shorter in females) and in the position of the ventral tubercles of p.-4 (placed more anteriorly in females) (Tab. 2). However, these differences are very probably a product of individual variability due to the low number of specimens.

The main difference between the two sexes is to be found in shape and position of the genital organ: in females genital flaps much more elongated (166–186  $\mu\text{m}$  –  $\sigma\sigma$  122–125  $\mu\text{m}$ ) and placed in a genital bay between the posteromedial margins of cx.-4; postgenital sclerite halfmoon-shaped like the pregenital sclerite, no postgenital platelet present; excretory porus at a distance of about 200  $\mu\text{m}$  from the posterior end of the genital organ, surrounded by a chitinous ring, ventroglandularia 3 lying separate in the membranous cuticula.

## Discussion

A significant character of *N. pontifica* is the position of the male genital organ. It is located far behind the posterior margin of cx.-4, while in all other *Nilotonia*-species it is placed in a genital bay formed by the cx.-4. Another important characteristic in both sexes is the chitinization of the excretory porus: It is imbedded in the postgenital platelet in males, surrounded by a chitinous ring in females. Besides *N. petri* (Cook 1979, only female known, excretory porus "on a small sclerotized tubercle"), in all other species it is separate in the chitinous cuticle, without any sclerifications. From *N. petri*, *N. pontifica* differs markedly in the shape of the mouthparts and in the leg chaetotaxy. As to the presence of a postgenital platelet in males, *N. pontifica* resembles the African species *N. loricata* (Nordenskiöld 1905), *N. violacea* Lundblad 1952, *N. scutata* Cook 1966 and *N. testudinata* Cook 1966 and the Israelian *N. hanniae* Bader, in press; in *N. buettikeri* Bader 1980 (Type series Naturhist. Mus. Basel), no ventral platelets could be found. In *N. loricata*, *N. scutata*, and *N. testudinata*, the postgenital platelet is remarkably enlarged as compared to *N. pontifica*; in *N. violacea* it includes the glandularia placed laterally to the genital organ while the glandularia flanking the excretory porus lie on unfused, roundish platelets; in *N. hanniae* none of the surrounding glandularia are incorporated in the postgenital platelet. Among all *Nilotonia*-species with a postgenital platelet in males, *N. pontifica* is the only one completely lacking any secondary chitinization of cx.-4. As to the chaetotaxy of legs, *N. pontifica* shares with *N. longipora* (Walter 1925) the presence of deeply-serrate, blade-like setae at the ventrodistal margins of segments 2–5 and of a long, slender subterminal seta at l.-IV-6. Presently, there is information about the shape of the genital skeleton of only 8 from 30 described *Nilotonia*-species: for *N. gracilipalpis* in Lundblad 1942, original description; for *N. loricata* (under the name "*N. rostrata* Lundblad") and *N. thermophila* in Lundblad 1952, original description; for *N. longipora* (Walter 1925), *N. parva* (Walter 1931), *N. pyrenaica* (Lundblad 1956), *N. robusta* (Walter 1931) in Gerecke (1991), and for *N. borneri*

(Walter 1922) and *N. caerulea* Viets, K. 1929 (own records, unpublished). All these species which belong to three different subgenera, share a genital skeleton with prominent brachia distalia and proximalia, an enlarged cella proximalis and a clearly visible carina anterior – in *N. gracilipalpis* the organ is relatively minute (total length 107  $\mu\text{m}$ ). *N. pontifica* differs from all these species in its flattened genital skeleton with minute brachia distalia and reduced carinae.

### Comments on *Manotonia* and *Nilotonia*

The new species described here is placed in the genus *Nilotonia* mainly because of the general leg chaetotaxy which is very similar to *N. longipora* and particularly because of the presence of a subterminal seta on I-IV-6. However, it shows important features so far ascribed to *Manotonia* Viets, K. (Cook 1974, Gerecke 1991): genital organ placed behind the posterior margin of cx.-4; genital skeleton without carina posterior. Thus, *N. pontifica* with its mixture of characters obviously bridges the gap between *Nilotonia* and *Manotonia*. After the appearance of connecting links, various taxa originally described as separate genera had been placed as subgenera in *Nilotonia* or are now regarded as synonyms of that genus (Cook 1974). As a result of the observations summarized here, *Manotonia* might also be redefined as a subgenus of *Nilotonia* characterized by the position of the male genital organ and by the features of the genital skeleton; it would contain the species *musvicola* (Walter 1935), *tegulata* (Viets, K. 1951) and *pontifica*. Furthermore, it is remarkable that Cook in a later paper (1979) described the female of a new species of *Nilotonia* without a subterminal seta on I-IV-6, *N. petri*. This species appears closely related to *Manotonia musvicola* and *M. tegulata*, as supported by its mouthpart characteristics (p-2 longish, p-4 with only minute ventral tubercles).

However, before beginning a reassessment of the taxa in question, studies on larval morphology and developmental cycles in Nilotoniid water mites and further data on genital skeleton morphology in other *Nilotonia*-species are required. In order to accommodate *N. pontifica* in the genus *Nilotonia*, its diagnosis should be modified as follows (after Cook 1974): Characters of the family Nilotoniidae; if dorsal sclerotization is extensive, the ventral sclerotization is always separated by articular membrane from the coxae and genital field; coxae in four groups or anterior coxal groups exhibiting varying degrees of fusion medially; fourth legs without claws, but terminating variously in a seta or in setae; claws on other legs with few to many clawlets. Genital skeleton with relatively long distal setae and with well developed lateral wall sclerites, but various in shape of brachia and carinae.

### Habitat

During extended investigations in the Pollino mountains, this new species was found only in a single isolated rheohelocrenic spring situated on a clearing in a beech forest, with full exposure to sunlight. The water disappears after a tract of about 100 m before reaching the forest without forming a continuous first order stream. The biotope is often affected by drinking cattle.

In the surrounding mountain forests, rheopsammocrenic springs in good natural conditions were common, while many of the rheohelocrenic springs in the pasturelands are heavily damaged by cattle, by measures for capturing their water or by drying up because of the rapidly sinking groundwater levels. Therefore, *Nilotonia pontifica* has to be regarded as a representative of a biotic community whose survival depends on the fast realization of the projects for the Natural Reserve "Pollino Mountains".



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